Data File Catalog

Dmitry Litvintsev, Fermilab
Eric Wicklund, Fermilab
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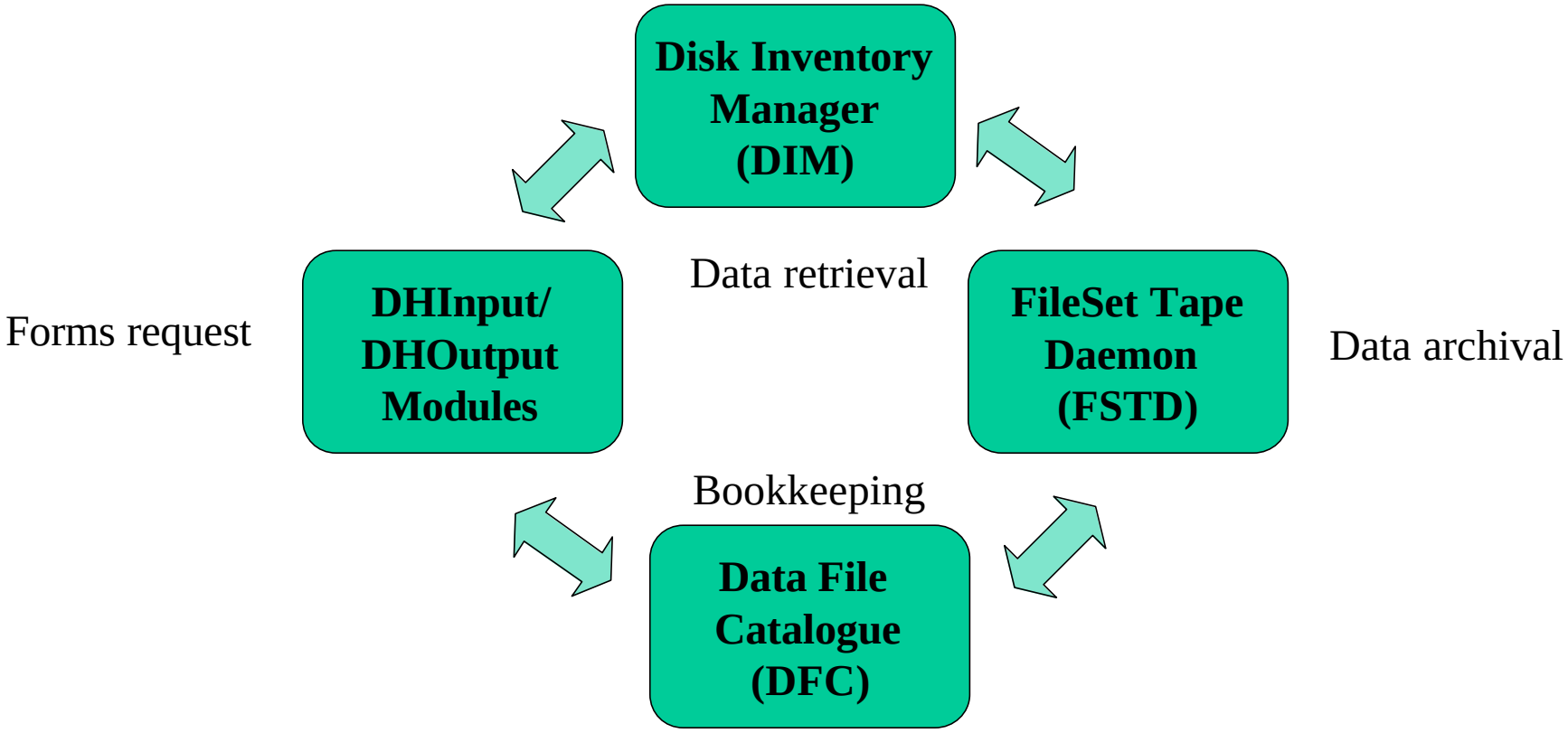
- Introduction
- Component Status
- Secondary Datasets
- Conclusion

DH System (simplified)

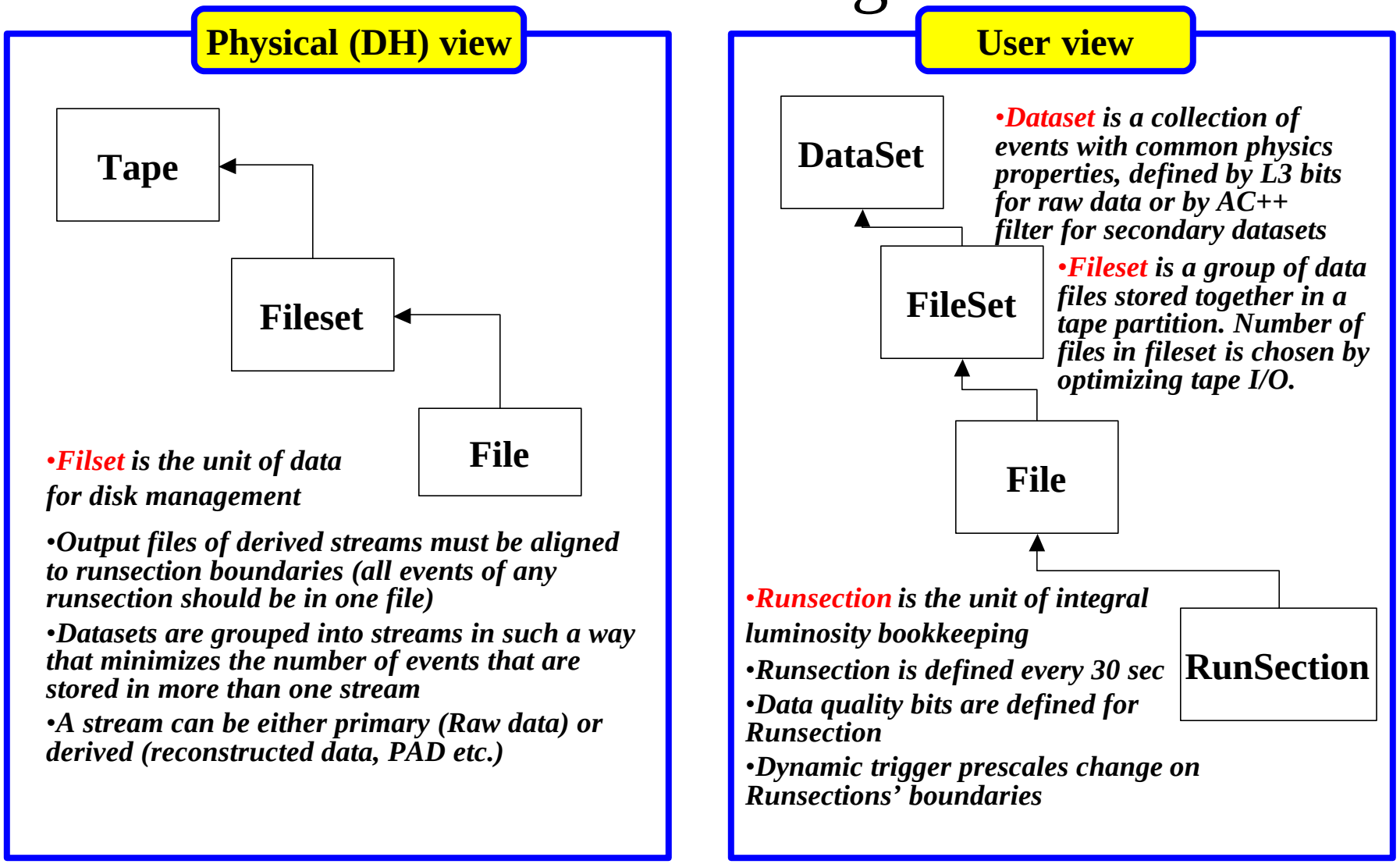
•DH System:

Organize, access and archive the data

•Components of DH System:



Hierarchical Data Organization



What is Data File Catalog

Data File Catalog (DFC) = Relational Database (DB) +

+ Application Program

Interface (API)

Data File Catalog

Information, necessary to locate any CDF Dataset (primary and derived), is stored in relational database. It contains:

- Four core tables corresponding to four elements of data access hierarchy:

  CDF2_DATASETS - datasets
  CDF2_FILESETS - filesets
  CDF2_FILES - files
  CDF2_RUNSECTIONS - runsections

- It also contains general bookkeeping information like tape volume contents and allocation:

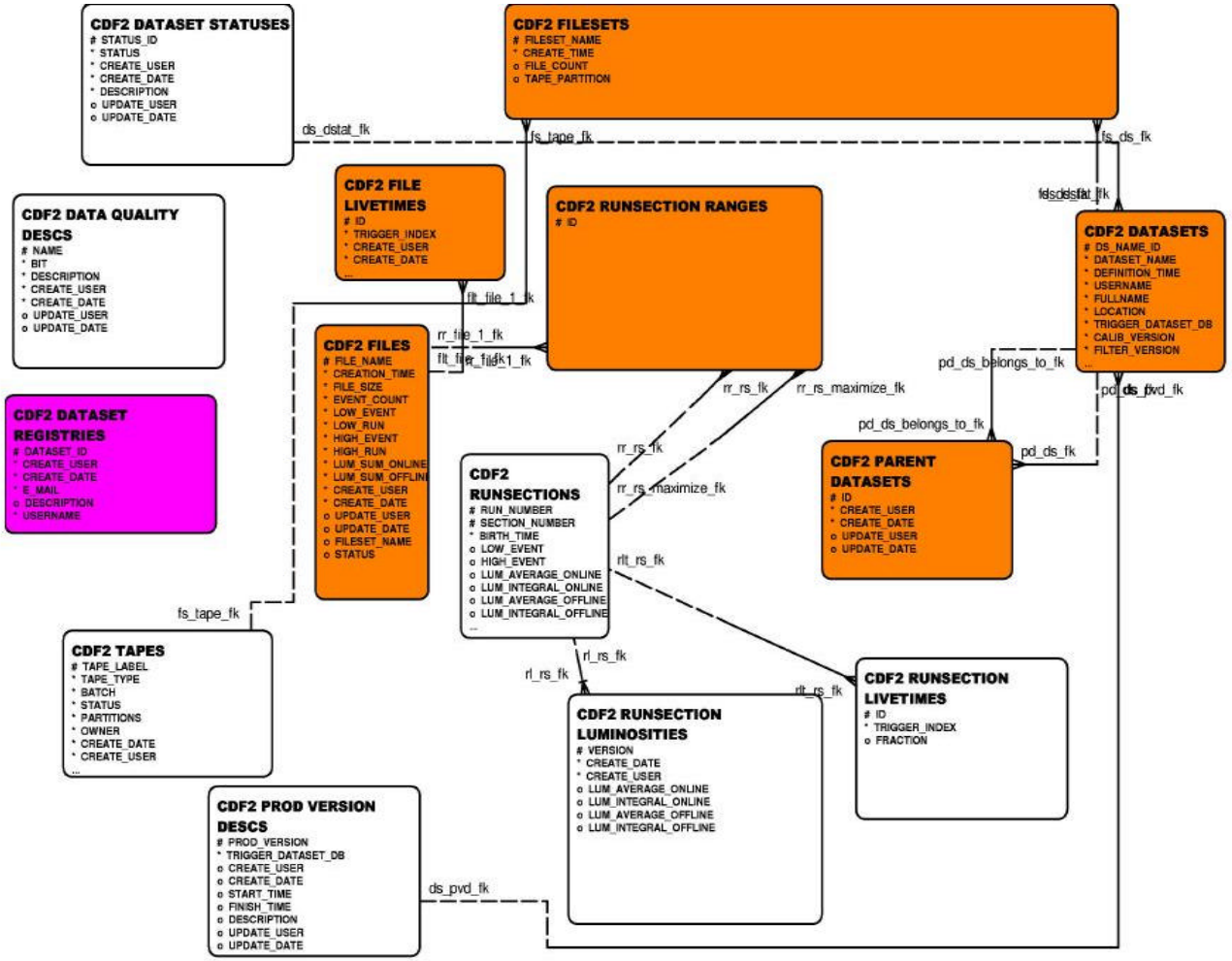
  CDF2_TAPES

- Keeps track of parent datasets:

  CDF2_PARENT_DATASETS

- physics related bookkeeping information such as data quality, trigger and filter used, average and integral luminosities etc
- Data access granularity of DFC is runsection. I.e. individual events are not described.
- Central DFC at Fermilab is an Oracle DB. Remote sites may use Msql to set up their local DFC.
- DataFileDB package provides all the code necessary to manipulate DFC from a C++ program of from command line. The package currently supports interfaces to Oracle and Msql implementations of DFC.

DFC DB schema



Some Numbers

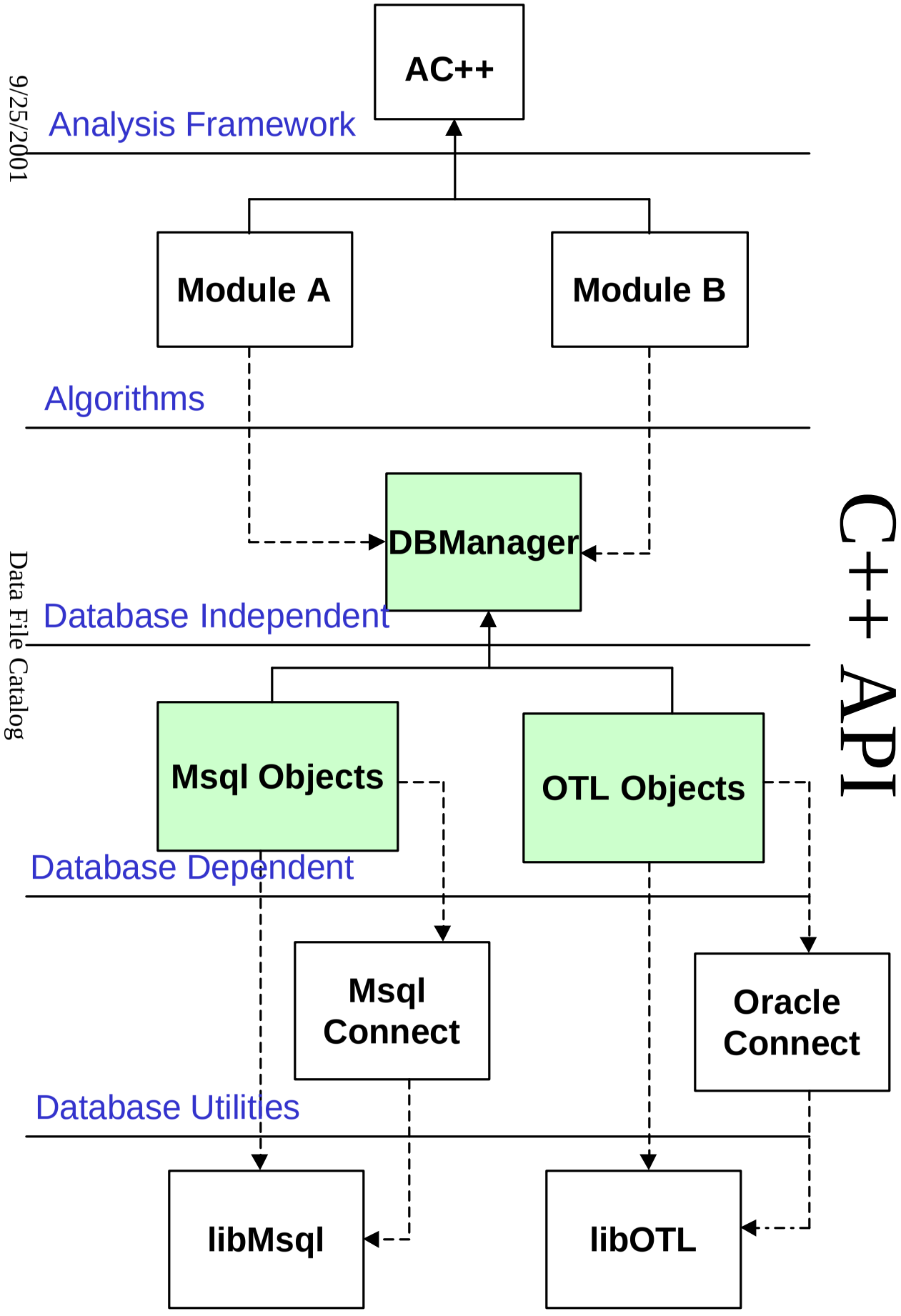
Table Name	Initial Mb	Next Mb	min	max	#rows	row size B	Used Mb
CDF2_DATASETS	1.1	1.1	1	20	84	195	0.016
CDF2_FILESETS	15.2	15.2	1	5	5567	51	0.273
CDF2_FILES	667	667	1	5	111189 (56197)	112	11.91
CDF2_RUNSECTION_RANGES	494	494	1	5	115309	50.4	5.547
CDF2_RUNSECTIONS	242	242	1	5	526905	54.4	27.34
CDF2_TAPES	4.7	4.7	1	5	1136	72.1	0.078

Oracle DB

- Oracle DB schema has been developed using Oracle Designer tool.
- It has passed review by Fermilab DBAs (J.Trumbo, N.Stanfield, A.Kumar)
- Space assignment for DFC tables and indices is sufficient to keep 4 years worth of data
- Space allocation is monitored on daily basis:

http://wwwcdserver.fnal.gov/cd_public/ods/db_stats/data/db_stats.html

Schema is stable. No major changes are foreseen


9/25/2001
AC++
Analysis Framework
Module A
Module B
Algorithms
DBManager
Data File Catalog
Database Independent
Msql Objects
OTL Objects
C++ API
Database Dependent
Msql
Connect
Oracle
Connect
Database Utilities
libMsql
libOTL

DataFileDB

- DataFileDB provides DB interface layer for managing the mapping of persistent data stored in DB tables to transient C++ objects seen my event processing software
- Allows keyed access to data in the DB
- Places get/put/change methods on top of transient class for retrieval or storage of objects of this class using a key

DataFileDB

- DataFileDB has five basic classes that define rows of DB tables:
  - DFCDataset
  - DFCFileset
  - DFCFile
  - DFCRunsection
  - DFCTape
- These objects have necessary interfaces and utility classes allowing user to manipulate them

DataFileDB:Example

Example of retrieval of all files from dataset aphysr from DB identified by "production"

```
      typedef Manager<DFCFiles,DFCFileKey> DFCFiles_mgr;
      DFCFiles_mgr m("production","DFCFiles");
//key class associated with file
      DFCFileKey key;
      key.setDatasetNameID("aphysr");
//typedef std::vector<DFCFile> DFCFiles
//tupedef Handle<DFCFiles> DFCFiles_var
      DFCFiles_var files;
      m.get(key,files)
```

DataFileDB Status

DFC C++ API provides interfaces for all relevant tables. Development has been completed. It is now in maintenance mode

Secondary Datasets proposal

User Books Development

• An idea to use Oracle-based DFC by physics group and individuals for bookkeeping secondary datasets has been put forth in CDF 5380

• The following requirements have been identified:

- The physics groups and individual users should have the same 24x7 service provided to official users for writing datasets
- Any user in CDF must be able to read datasets created by another user
- The physics groups must not be permitted to delete entries made by official users while being able to delete entries made by themselves
- The physics groups and individual users must not be permitted to fill up Oracle tablespace of the official users
- Physics groups must not delete entries made by other physics groups
- Physics groups must not delete entries made by individuals
- An individual user must not be able to delete entries made by other users

Secondary Datasets proposal

• It is suggested that there will be some tables common for the whole experiment, such as CDF2_TAPES table which holds list of tapes in a tape robot and some other tables for which physics groups or users may have personalized versions.

• Six such tables have been identified:

CDFPEXO.CDF2_FILES
CDFPEXO.CDF2_FILESETS
CDFPEXO.CDF2_DATASETS
CDFPEXO.CDF2_PARENT_DATASETS
CDFPEXO.CDF2_FILE_LIVETIMES
CDFPEXO.CDF2_RUNSECTION_RANGES

} exotic book

• Make use of Oracle quota and access mechanisms

Secondary Datasets procedures

Procedures

- Application for externally authenticated Oracle account
- This account will have necessary privileges (grants) in order to be able to setup private version of DFC
- User will then need to execute a simple script:

DFCMakeUserBook joseph /@cdfofprd

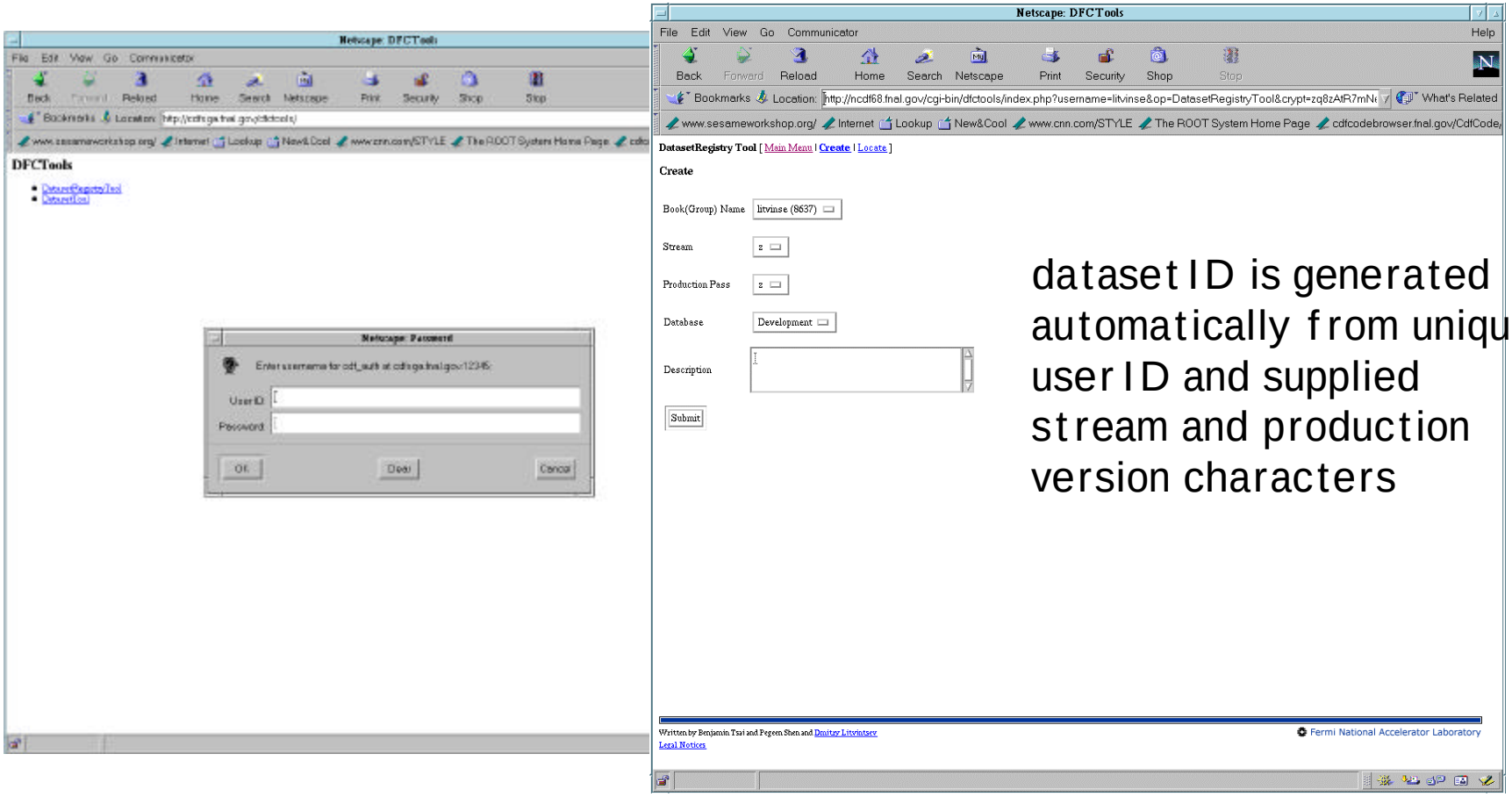
This script will create a private DFC schema in JOSEPH account

- User may use DHOutput/DHInput modules to fill/read his private DFC. For example:

```
talk DHInput
   include dataset “My Jpsi sample” book=joseph
exit
```

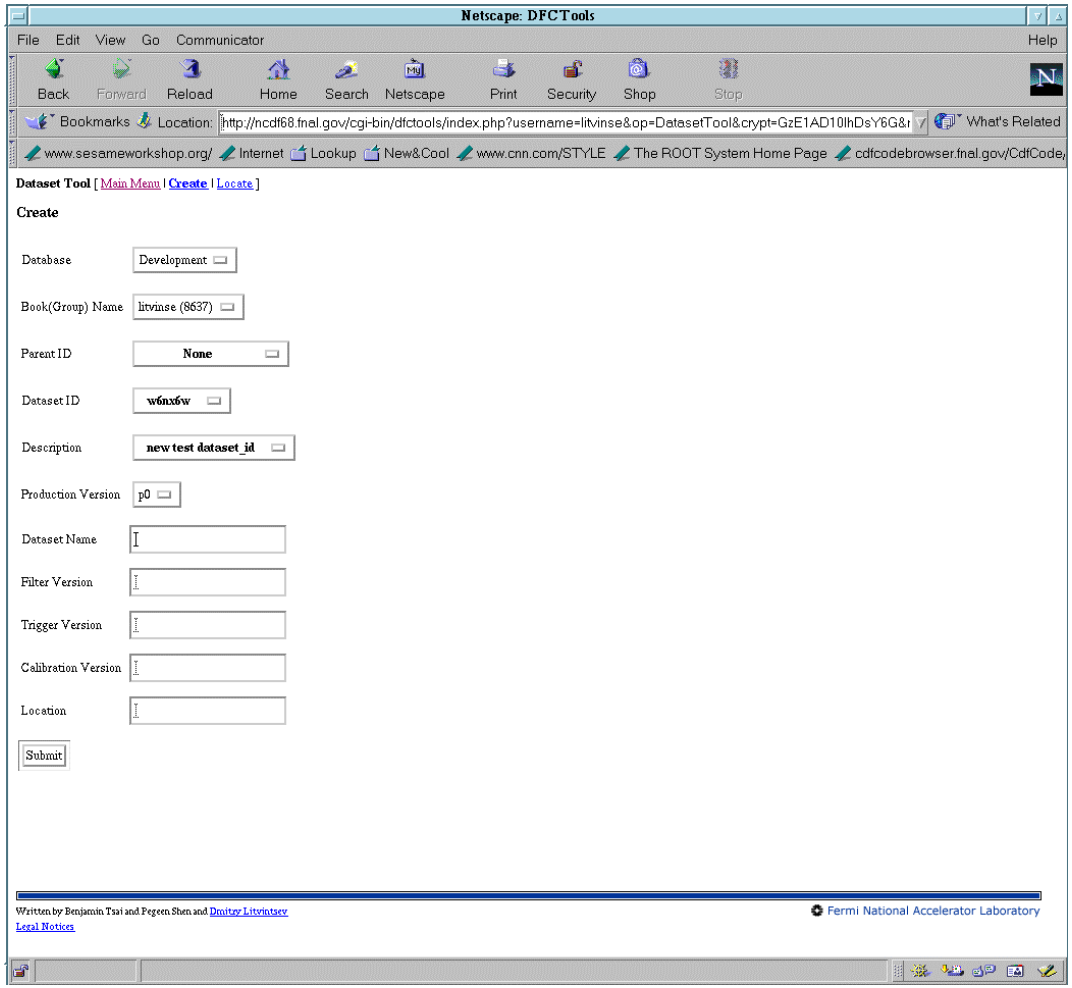
Secondary Datasets registry

Dataset Registry GUI



datasetID is generated automatically from unique user ID and supplied stream and production version characters

Secondary Datasets booking



Secondary Dataset Status

DFC Part

- All scripts are ready
- The DataFileDB package and DHMods package have been modified to accept book parameter
- Dataset Registry procedure has been worked out and tested
- Easy to use WWW GUI interface exists for Datasets
- Need to implement similar interface for Tape allocation

Operational Issues

- DFC maintenance (relatively minor load)
- There is a problem of file entries (about 55,000) which were not recorded on tape. There needs to be a mechanism of clean deletion of those entries
- At some point revisit CSL-LumMon interaction when filling on-line luminosity numbers
- It would be good to have an AIT-2 tape drive attached to fcdfora1 for regular backups of DFC
- Operational issues related to user books:
  - setting up and testing communication between File Set Tape Daemon and DFC when allocating and writing a tape.
  - Error handling within FSTD s/w
  - user consulting
  - user support
  - Oracle operations
  - scripts to copy/move datasets from one book to another
  - installation and support of DFC at the remote institutions

Conclusion

- CDF DFC has been functioning smoothly for about a year
- We have not experienced any significant problems with both Oracle and C++ software
- DFC Software and Oracle schema are ready to handle secondary datasets